



SQL Solutions, Inc.

DBMS

DEVELOPING CORPORATE APPLICATIONS

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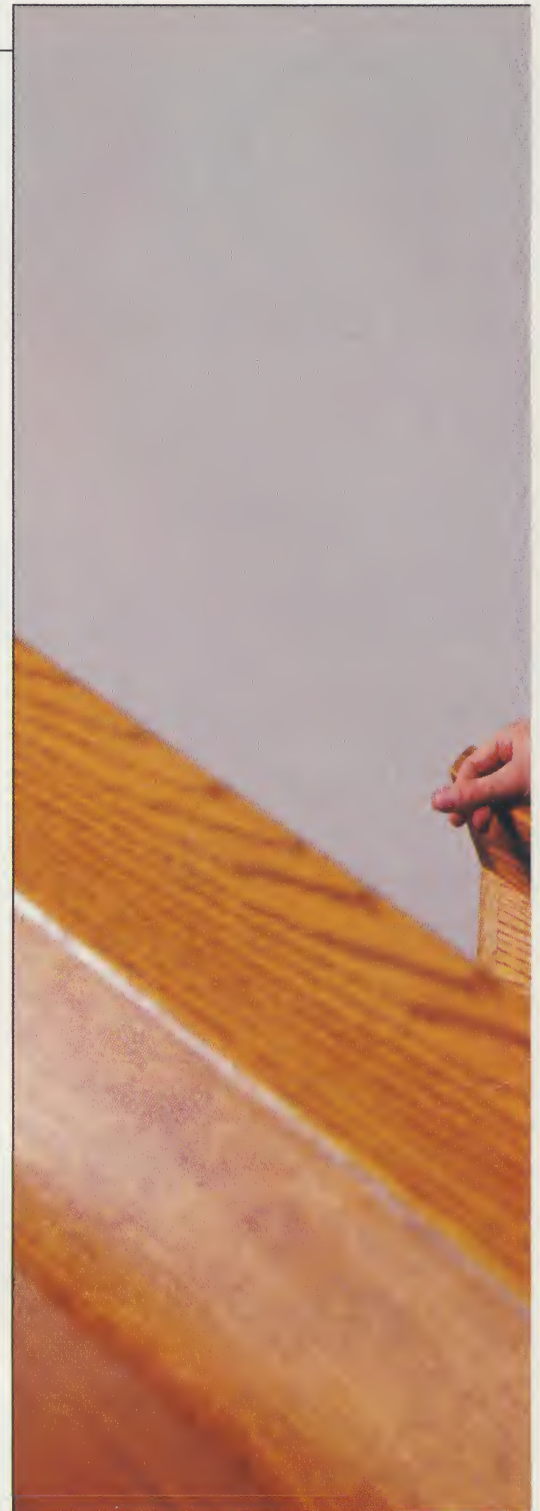
Bob Davoli this spring celebrated ten years of computing, the past five years as cofounder and president of SQL Solutions, a Burlington, Mass. database consulting organization that in 1989 became a wholly-owned subsidiary of Sybase Inc. He brings to his present work the diverse background of a college history major, public schoolteacher, and performer and teacher of jazz and classical guitar.

Davoli studied computer science at Northeastern University in the late 1970s to launch another career, which he began by working as a systems analyst with Stone & Webster Engineering Corp. in Boston for three years. He joined Associative Design Technology Inc., of Westborough, Mass., in 1984 as a program manager for consulting projects, later serving as a contributor to the company's development of CASE products. He began his work as an independent database consultant by cofounding D&N Systems with Dave Newsom in 1986, offering services that focused on logical database design and application development under Oracle running on a VAX and CASE tools.

That partnership's early work with relational databases prompted them to also design development tools to fill that early void, and to meet the needs of managing production databases and users. The first such product was DBA Companion, a database administrator's tool to track usage, set user privileges by classes, take application inventory, and perform other tasks that previously were handled manually — all bred of the team's desire to automate and ease some of their work with Oracle products. Programmer productivity tools followed, including SQL syntax checkers, editors, debuggers, and other utilities, offering the 4GL environment some of the niceties programmers were accustomed to in 3GL environments, Davoli says. Still, the company remained a pool of consultants, who developed tools to make their own jobs easier. They began marketing the products in earnest only last year.

The two-person, \$150,000 company founded in 1986 grew to a \$2.3 million firm in 1988, doubled its revenues the following year, and produced \$15 million in revenues in 1990 — still under the direction of a couple of systems analysts, contrary to high-tech, high-growth wisdom that calls for recruiting a "manager" as a company develops. SQL Solutions now employs some 200 people, about a third of them in product sales, which account for about one-third of SQL Solutions' revenues.

SQL Solutions' role as a group of consultants who install client-server applications in organizations, and who pitch the need for organizations to re-engineer their computing systems and become truly information-based companies, is the focus of the following edited transcript of Davoli's recent conversation with *DBMS* Editor in Chief Kevin Strehlo.



DBMS: Who were your customers in those early days of relational DBMSs?

DAVOLI: It wasn't an MIS person. If you were working within a financial domain, maybe it was a financial manager who became frustrated with trying to get an application built by MIS.

DBMS: And using a lot of VAXs?

DAVOLI: Lots of VAX 780s and 750s, and later lots of MicroVAXs. And with a heck of a lot of people on them. Initially, people were very disappointed with the



PHOTOGRAPHY BY BILL O'CONNELL

performance because they would try to put too many users on, and they wouldn't control the ad hoc queries that people would do, and you could bring the system to its knees quite easily.

DBMS: Didn't MIS get nervous about you working outside their control?

DAVOLI: Absolutely! It was the Computer Department back then, and they got nervous when relational databases came in. If you look back at MIS organizations, you see that they grew so fast that they

promoted people to management positions who really weren't managers; it was organized by territory. They saw these changes as something being taken away from them. Today, we're getting more sophisticated management in there who can look at the overall organization, not just at MIS. There are certain things MIS should control, such as managing the network and database administration.

DBMS: Even today we hear about people from MIS backgrounds who

are reluctant to put a relational database application on a PC-LAN. Is that something you run into?

DAVOLI: MIS reluctance has been around as long as I can remember. It's so pervasive. MIS started getting nervous when people brought in products like Focus, back in the late 1970s and early 1980s. And they got nervous when PCs came in.

DBMS: In many cases, MIS owns the PC platform, yet we understand some

are still reluctant to entrust critical applications to the Intel architecture and PC-LANs. They see client-server LAN applications as part of an untested world of unproven technology. Do you run into that?

DAVOLI: Somewhat, although I must say that there are a lot of organizations doing some very innovative things out there today with LANs and WANs and tying together the enterprise-wide organization. They're definitely pilot phases. They want to know if it will really work, so they try to get an application up and running. The next step is to tap into the mainframe using gateway technology. We believe the network is where everything is happening. But the management of this environment is very difficult because of the interdependencies of the multiple technologies needed to realize an information-based organization.

DBMS: It seems there's an inherent problem when you start seeing hardware, and the software running on it, becoming less expensive. Does the people cost, the cost of support and of consulting, have to get less expensive and scaled down as well?

DAVOLI: No, I think there's always going to be a need for those services. As long as it can be justified from a business perspective, if the technology will enable a company to be more profitable or gain a competitive advantage. When you have applications that are mission-critical, you are always going to need a direct field sales force and the support that goes with it. If anything, SQL Solutions could probably charge more because the work is more complex. It's one thing building applications that use VT-100s that tie into a local mainframe, and another thing entirely when the application has to interact with a whole slew of data sources, the network, and communications while trying to re-engineer the business in order to take advantage of new technology.

DBMS: How often do you run into a company that has multiple flavors of relational databases compared to shops that use just one?

DAVOLI: At the Sybase International Users Group meeting this year, I asked the thousand or so people in the audience how many had just one relational database. Nobody raised their hand. We never run into a Fortune 1000 company that has a single relational database. A large insurance company we worked for had four of them.

People are looking at their organizations and saying, "How can we cut computing costs?" You go into their environment and they have an application running in, say, Ingres or Oracle or Informix, or even IMS, and they don't want to move it.

I don't think it's wise as a consultant to say, "You have to get rid of this and we'll implement the new technology." You've got to show people how you can integrate applications, preserve their existing systems, and then propose an architecture that can satisfy their business needs. You've got to show them how applying information technology can help them better manage their growth, be more competitive and more profitable. It's called re-engineering.

DBMS: That's not easy. For example, how do you get several relational DBMS products to work together?

DAVOLI: Initially, people downloaded data, but it was a pretty coarse, crude kind of downloading. What we've done recently is build gateways that are actually translators. Essentially, you want to let people use client-server computing because that's where they can get the reduced costs. So we look at the mainframe as a disk drive, if you will — a big storage peripheral. We want to bring that data down to the mini and micro level, which is where people want to use it, let people manage that data with powerful front-end tools, and then put it back up on the mainframe. But there's a lot of work to do in that arena because there's an inverse relationship: The more end-user transparency you get, the more complex it is to implement, because there's a need for a lot of interdisciplinary expertise. You need to understand connectivity, network security, communications, the RDBMSs, the front ends, CASE, etc.

Then there's the caveat: The more you interoperate hardware and software, the more you realize how dirty your data is. When you tie all these systems together you realize, my gosh, there's a lot of redundant data out there. A data item that one department calls one name another department calls by another. So, part of the process is building a really strong data administration function within the organization so that you can have one place that specifies naming conventions for all the different data items you use. You have to go through that process if you're really going to have an information-based organization. If you don't do it, you're going to have instantaneous, transparent access to garbage.

DBMS: It sounds like when you first go into a company and try to see what's out there, it's first a data analysis job.

DAVOLI: It's a business analysis job, really. What we're trying to say to people is, "Look, there's an opportunity to restructure your organization and you can do that through re-engineering." Re-engineering means re-examining the business process itself. Business is moving away from the hierarchical-based

organization that was characterized by division of labor, where information and control were passed up and down the chain and managers were the buffers at each level. Well, in the information-based organization, we say, "How can we bring the information to the person?" We view it as a transaction in which the database is the intermediary — an information warehouse that users interrogate to do their jobs. If a salesperson can now take an order and see if the product is available and know what the latest price is and determine the ship date...

DBMS: And check credit history...

DAVOLI: ...and check credit history and do all that — that's the information-based organization. We leverage information technology so that we can be more profitable and more competitive and manage growth better, and that is diametrically opposed to the division of labor-based organization.

DBMS: American Airlines is a great example of a company that has used real-time online transaction systems to create a competitive advantage. OLTP helped put People's Express out of business. American tracked how full their own flights were, and if seats were going to go unsold when American had a flight at the same time as a People's Express flight, American would undercut People's Express pricing.

DAVOLI: There you go. Information is a weapon, and the technology to make it a weapon has evolved very fast. The number one concern among information systems people today is restructuring, re-engineering. They realize, "Gee, we're cutting staff — how do we work smarter now?" Can information technology play a place in that arena? There are about four business-enabling actions that are going on right now: re-engineering, creating information-based organizations, out-sourcing, and downsizing. And then there are technology-enablers that facilitate those things, like relational databases, networks, front-end tools, and CASE tools.

DBMS: So do companies call you and say, "Hey, Bob, we'd really like to re-engineer, we'd like to start again, see what we've got and start consolidating things?" How does that conversation get going?

DAVOLI: Actually, people are still in reaction mode. They say, "Oh, we've got this project and we've got to get it done." You rarely get to do it right as a consultant. You go in and prove yourself for a give project and then you start talking about your vision and how technology can be applied. And if you did a good job with their project — well, that's how we started.

DBMS: So you pitch to upper management and show them the advantages, in their terminology.

DAVOLI: You've got to speak on the business terms: increased profitability, managing growth, and so on.

DBMS: So where do you guys get that? You're a guitar player with a history degree and a couple of years of computer science classes. How do you know about the business side?

DAVOLI: We started hands-on and then learned about data modeling, process modeling, re-engineering. By applying the technology, we developed our own methodology called RISE — Relationally Integrated Systems Engineering, which is a compendium of tools, techniques, and services for developing SQL-based applications in the heterogeneous environment. A lot of it was trial and error. I'm not the first person who learned on the fly.

DBMS: Have you been able to put RISE to work? Has there been a case where, after a successful project, you pitched an overall plan and were able to really take apart a company's data operation and put it back together again in a more coherent fashion?

DAVOLI: I wouldn't say we've done that on a global basis in a Fortune 1000 company. You have the bits and pieces, you try to apply it to the project, then you say, "Gee, the next thing we want to do is develop a long-term strategy, analyze your existing systems, and make a transition plan." We're in that stage with companies right now.

DBMS: What do you see happening now in terms of downsizing?

DAVOLI: When I talk about downsizing, I don't mean just mid-range machines, I mean PCs, too. The client-server paradigm is really independent of whether it is housed on UNIX or OS/2 or a DOS-based system. What I advocate is a way to look at the business and say, "Where does this work really belong? Who really does this?" and let that person be responsible for it. That may mean synchronizing the entire organization so that we're not getting out of control. The business process should dictate what work is to be done locally. However, there may be a global need for information, and we can't just let people at a local level make policy decisions for the whole organization. So you get this MIS-ware and this personal-ware, and you put in the glue to manage the environment. I really believe that's why data administration is such a key role in this environment. People are getting dizzy on the technology but if we don't manage the data and keep it clean...

DBMS: What you're describing sounds like a case where there's a central

database system that's doing something globally for the organization, but you're replicating data out there every night to a local region so they can do some things during the day and then send the data back up to the larger host at night?

You want to let people use client-server computing because that's where they can get the reduced costs.

DAVOLI: We envision the evolution of some kind of subscription service. People say, "I need this kind of data" and the corporate source agrees that you do need this data. You subscribe to this data and we refresh it whenever you need it. Do you need it every two seconds, every day, every two days? We align the organization.

DBMS: Our columnists Martin Butler and Robin Bloor offered a theory recently that UNIX is just another operating system, a commodity, and so rather than UNIX being the key, the real key is standardizing at a higher level. We're standardizing on SQL and perhaps on portable 4GLs that will play on a lot of different platforms. Eventually standardization will go a step higher, so you're working from a CASE kind of environment that produces applications built from the various SQLs and 4GLs. Do you see that kind of scenario happening, where the development focus keeps moving to a higher level? Do you agree that SQL is the basic open system now, and eventually it becomes a CASE and repository world? And thus your company becomes CASE Solutions instead of SQL Solutions?

DAVOLI: That's cute. But let's look at the environment. Even if they're right, and for standards the one that matters is SQL, that really doesn't mean a heck of a lot, because everybody's got different flavors of SQL. The vendors can't even agree on how to do error codes, or embedded SQL, or anything. The reason I have a hard time with your columnists' paradigm is because it ignores mixing and matching. Integration is the key. Open means "the capability to interoperate" and the capability to tie things together that are disparate.

DBMS: What about efforts like SQL Access, where they're trying to define a common standard?

DAVOLI: SQL Access is a noble effort. When it does happen, we'll all adhere to the standards. But right now, people need access to foreign data. They need to get at that process data on a real-time system. They need to get at some application that's been around for awhile, or to access database servers. We have to service our clients.

DBMS: So you use a tool like Sybase Open Server, which provides an application programming interface (API) on the server side to complement the one on the client side. And people who need access to foreign data from relational tools write some code in order to make that match to the foreign data, so it looks like relational data to an application developer?

DAVOLI: That's right. But it's not easy enough, which is why we've built a configuration language on top of Open Server. Essentially, we've built a library of routines that let you configure services. For example, one of the things we've used this language for is to build gateways. You could build a multiplexer, you could build E-mail. Once again, we're building a toolkit in much the way SQL Solutions has always built toolkits. We built a toolkit so that people can have an easier time building Open Server applications.

DBMS: What do you think of the PC database companies that are now looking at client-server as an important part of their future? Some of them are focusing strictly on a front-end kind of strategy. Borland says, "Hey, we have nice tools on the front end and we'll connect to everything as time goes on." DataEase has taken a similar approach. And Ashton-Tate is starting to talk about connecting to a variety of servers with their dBASE IV Server Edition, which may be out there by the time people read this.

DAVOLI: I wonder about these — and I don't mean this in a pejorative way — these "toy" databases, the ones that don't have complete transaction management: consistency control, concurrency control, security control, and recovery control — are they robust enough?

DBMS: Do they have to be, if they are just the front end in a client-server system?

DAVOLI: Well, they have to be robust enough in the sense that the applications can actually be built using the front-end tools, and those tools have to be supported well by the vendors. If they are, I think they'll have a place in the market. But then again, if the corporation decides it wants to make a "strategic commitment," is it going to do it with these PC-type databases that right now

are sprouting up willy-nilly all over the organization?

DBMS: There are so many dBASE programmers trained out there, and they're putting together applications that run departments. They're doing the same thing you were doing, when you were putting out applications on a VAX 750 or a MicroVAX. So what's to keep them from becoming important players?

DAVOLI: They could. Again, the bigger problem will be how to manage an enterprise and how to control it, secure it, and keep the data all in one area. But you're right, it's just another piece of software that's proliferated. So if there's five more out there proliferating, who cares?

DBMS: You learn to cope with it.

DAVOLI: You learn how to cope with it, you learn how to interoperate.

DBMS: What's next for Sybase? It has a relational database, a consulting arm, a CASE tool. What else do you need to complete the package? Is there a hole still in the Sybase solution set?

DAVOLI: You're going to see the confluence of four technologies over the next several years: CASE, relational databases, object-oriented design and development, and expert systems. With Sybase, we've got a very fine server, and we've got this client-server interface that can let you tie into anything you want to tie into: data, text, images, etc. We also have an integration arm that is conversant with the communications, networks, the various databases, and data administration and methodology. And we've got this CASE tool that automatically generates data definition language for multiple RDBMSs. You can also lay out your forms, you can do your program structure diagrams and your data flow diagrams.

The next thing we're all going to be working on can be exemplified by using the ANSI three-schema architecture, which is comprised of the external or user view, the conceptual view, and the physical view. The interface between the conceptual and the physical, that's SQL. And what SQL did is let users say, "This is great! We no longer have to worry about how or where data is stored. We can say `SELECT * FROM Fred`, and voila, like magic all this data comes back." But we got tangled up, too, in all this decision-support stuff. We could actually do OLTP with the advent of Sybase, and it's a whole lot more complex than we thought because of all this application development. So, the next technology will be what I call business programming, where, for example, user interfaces will be created dynamically, based on the external

data dictionary, the conceptual dictionary, and an inference engine that analyzes business rules.

DBMS: IBM's AD/Cycle proposes just that kind of scenario....

DAVOLI: I think a lot of vendors will be working in this area. We've got to provide the same kind of transparency between the external and the conceptual view.

DBMS: People seem to be able to tell a very good story in object-oriented databases if what is being developed involves really complex in-memory data structures, like CAD-CAM or CASE tools directed graph structures, and the need is for some kind of sharing of those in-memory data structures, with concurrent access for many users. But that may mean controlling transactions like editing a CAD element, so the transaction might last for six hours. It's a different world.

DAVOLI: It is a different world. And remember, even the relational database is in its infancy. Corporations don't run their businesses with relational databases. Right now, of the installed, staple applications in Fortune 1000 companies, maybe five percent are built using relational technology. But in ten years it will be about 70 percent. There's always a gestation period with new technology, just as RDBMSs are beginning to evolve from departments to MIS usage as the vehicle of choice for storing and retrieving information.

DBMS: Okay, so let's not get ahead of ourselves with the "next" technology. But what's been holding relational back? Is it just because it's a new technology, relatively? Is it lack of people who know about it? Is it performance? Is it just all those legacy applications and all that data sitting in prerelational data structures?

DAVOLI: Performance certainly is one thing. And certainly all technology has to go through that gestation stage where you try it out, add new features, rearchitect. Also, you need the tools around the database to manage production environments and all those users. People are not going to bet their businesses overnight on new technology. IMS didn't happen overnight, and a lot of companies are still running on IMS, as is evidenced by the gobbs of COBOL code being cut.

DBMS: If there's a dearth of tools anywhere, it's particularly evident on the PC-LAN platform. There's no transaction processing monitor and very few tuning tools for OS/2. You and I believe there's going to be a proliferation of LAN-based tools, but will they congregate around OS/2? Or UNIX? Or....

DAVOLI: Both. Look at our tools for programmers. If someone is going to code in Microsoft C, they use CodeView, right? You need to be able to step through code, trace code, print variables — in other words, to debug code. Well, the same kinds of things are needed for SQL, and we have a source-level debugger for SQL. We are certainly porting our tools to the OS/2 environment. Normally our development platform is UNIX, and then we port to VMS or OS/2 or whatever. I think you'll see a lot of development tools down on the PC in a short time. Not just application development tools, but programmer productivity tools and DBA tools.

DBMS: Returning to the question of which OS will dominate the LAN — it still seems that we're just getting there now on the OS/2 platform. Think about the whole story of scalability that Microsoft, or Ashton-Tate actually, was telling during the early days. Run out of gas on OS/2? No problem, just move up to more powerful hardware. Well, it's just now that the PC-level drivers are there, from Sybase, to let PCs hook into those larger platforms.

DAVOLI: Sybase was late getting the products out.

DBMS: Microsoft is talking a good game in the "information at your fingertips" arena. And in Windows they are showing a front end that seems to be catching on. Is a company like that capable of doing a consultant-intensive job like cleaning up the data and making all these connections?

DAVOLI: Microsoft seems to want to concentrate on the Windows programming and would partner with companies like us, or other systems integrators, to do the networking, communications, requirements analysis, and heavy database work.

DBMS: Is that something relational database companies will have to do in general — bolster their consulting and services arm? Certainly if the price of database server software comes down to the kinds of prices seen on PC LANs, which is much cheaper than mid-range hardware's software pricing, well, then companies like Sybase won't be able to make a living on the revenue from the software sale anymore.

DAVOLI: And look at the size of system integration businesses that wrapped themselves around the earlier, prerelational technology — like the Andersens and the EDSs. That's why at SQL Solutions we're positioning ourselves as the SQL systems integrators. ■